MEMORANDUM

To: Davis Zhen, EPA (not sent yet)

From: The Pre-RD AOC Group

Subject: DRAFT Decision Tree and Modified Protocol for Surface Sediment Recovery Depth Acceptance Criteria

Date: May 4, 2018

This memorandum recommends a revised protocol for acceptance criteria related to sediment grab low recovery depths for the varied substrate conditions encountered by field teams during surface sediment grab sampling. The field teams are using a power grab sampler with 1,000 lbs of closing force and up to 490 lbs of weight (including 250 lbs of removable ballast weight). As discussed during our tech-to-tech call with EPA on May 2, 2018 regarding recovery depths, the field teams are not consistently achieving > 20 cm penetration depths because of substrate conditions that range from woody debris, gravel in jaws, sand & gravel bottom conditions, steep slopes, and no recoverable sediment areas (e.g., bedrock, riprap etc.). If accepted by EPA, this protocol will be a clarification to the EPA-approved field sampling plan (FSP) and minor modification for "no recoverable sediment", such that field teams will immediately begin to use these revised acceptance criteria.

The revised protocol covers four substrate conditions encountered during sampling:

Substrate Category "Bin"	Substrate Description	Acceptance Criteria for Recovery Depths	Example (3-Pt Composite)
1	Soft Sediment: full penetration depth expected	Minimum of 20 cm recovery depth in each accepted grab (adjust weights if overpenetration encountered)	30, 30, 22 cm
2	Sediment with Debris: makes it difficult to consistently achieve full recovery depth	Minimum 10 cm recovery for each subsample; up to 5 attempts per location	22, 19, 12 cm
3	Sand & Gravel: low penetration depth expected, likely < 20 cm	Add additional weights, minimum of >10 cm recovery depth	10, 15, 15 cm
4	No Recoverable Sediment: (e.g., bedrock, riprap, cobbles)	After one to three attempts, if no acceptable sample, use probe to confirm bottom substrate and document	0, 0, 0 cm

These recommended changes are based on (a) field conditions that we are encountering, (b) our draft decision flow chart sent Friday April 21, (c) your email dated Monday April 23 with requested changes to field sampling plan, (d) our modified protocol sent Friday April 27, and (e) our discussions during May 2, 2018 technical call. The protocol is expanded below to describe several scenarios that may be encountered in the field:

- Go to primary location provided no access or safety issues. While at Primary Location,
    - Soft Sediment: if all subsamples are > 20 cm, then collect sample and analyze;
        - If overpenetration is encountered in a portion of the grab (e.g., mud is pressing again the top of the flaps), then collect material from portions of the grab that are not over-penetrated;
        - If majority of grab is over-penetrated, then reject sample, remove ballast weights and retry.
    - Sediment with Debris: If wood fragments, debris or other gravel-related material is encountered (i.e., jaws aren't closing, material lost during retrieval because jaw did not make a tight seal, or majority of material is debris),
        - Target a composite average > 20 cm but acceptable to collect sample and analyze when all subsamples are > 10 cm minimum
        - If unsuccessful, then sequentially proceed to 50 ft radius for up to 5 attempts in the primary location and use the three subsamples with greatest recovery > 10 cm.
    - Sand and Gravel: In sand and gravel where lower recovery is expected (10 to 20 cm penetration depth range), if the average depth is > 10 cm then collect sample and analyze; all subsamples should be > 10 cm minimum depth (make sure all weights are used to maximize penetration depths, up to 5 attempts and composite the three subsamples with greatest recovery).
    - No Recoverable Sediment: If no recoverable sediment is encountered (bedrock, cobbles, riprap) with low penetration (i.e., less than 10 cm) repeatedly encountered, then probe area and document substrate conditions (probing after 1 to 3 attempts depending on conditions observed).
- Go to Alternate 1 Location provided no access or safety issues
    - If access or safety issues with the Primary Location;
    - If recovery is insufficient per guidelines for Primary Location (less than three subsamples with 10 cm recovery samples after 5 attempts within 50-foot radius for Sediment with Debris or Sand and Gravel conditions);
    - If No Recoverable Sediment at Primary Location.
- While at Alternate 1 Location
    - Repeat steps listed for Primary Location
- Go to Alternate 2 Location
    - If access or safety issues with the Alternative 1 Location;
    - If recovery is insufficient per guidelines for Alternate 1 Location (less than three subsamples with 10 cm recovery samples after 5 attempts within 50-foot radius for Sediment with Debris or Sand and Gravel conditions);
    - If No Recoverable Sediment at Alternative 1 Location.
- While at Alternate 2 Location (provided there are no access or safety issues)
    - Repeat steps listed for Primary Location.

    - Consistent with the FSP, accept the best of three attempts to make a 3-pt composite or record substrate conditions if no sample collected.

- NOTE: for substrate type 2, if substantial debris is encountered then it would be acceptable to consider a 2-point composite sample after 9 combined attempts at a sample location (3 attempts at primary, 3 attempts at Alt 1, 3 attempts at Alt 2). The sample should be composited from one of the three locations.

Last revised by AGF on 5/4/18; saved in P \Projects\Portland Pre-Design PNG0767A\500 Technical\Surface Sampling Depths